

**Before The  
FEDERAL COMMUNICATIONS COMMISSION**

**Washington, D.C. 20554**

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**In the Matter of**

**Revision of the Commission's rules  
to ensure compatibility with  
enhanced 9-1-1 emergency calling system**

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**CC Docket No. 94-102**

**RM-8143**

**To: The Commission**

**REPLY COMMENTS**

**of**

**SMITH ADVANCED TECHNOLOGY, INC.**

Smith Advanced Technology, Inc. (SAT) hereby submits its Reply Comments in CC Docket 94-102 in which the Commission has requested comments regarding wireless communications in the commercial mobile radio service (CMRS) and its compatibility with enhanced 9-1-1 emergency calling systems.

## **General Comments**

It is clear in the comments received by the Commission from the National Emergency Number Association (NENA), Associated Public Safety Communications Officials Inc.(APCO), the Personal Communications Industry Association (PCIA) and the National Association of State Nine-One-One Administrators (NASNA) that there is a very real problem with the existing wireless technologies and their information interface with the 9-1-1 network. It is also very clear that there is a genuine concern for the introduction of other wireless communications technologies and their impact on the national 9-1-1 network.

While Smith Advanced Technology, Inc.(SAT), can not address every issue indicated in the Notice of Proposed Rule Making (NPRM), we can address those areas where our technology can have an impact. Below is listing of the issues identified in the NPRM , the items indicated with a “★” are those items for which our technologies can have a relevant and significant impact.

- Availability of 9-1-1 to wireless telephone users.
- ★     ➤ Ensure that 9-1-1 services are not compromised by new developments in technology.
- ★     ➤ Require commercial mobile radio services (CMRS) to provide real time voice service to include Enhanced 9-1-1 features available to wireless users. Those features shall include, but not be limited to:
  - 1) Automatic Number Identification
  - 2) Automatic Location Identification
  - 3) Selective Routing
- A single three-digit number, 9-1-1, for nationwide access to emergency services.

- ★ ➤ Personal Communications Services to provide accurate location information for 9-1-1 callers from the outset.
- Mandate a single 9-1-1 standard for all wireless technologies.
- ★ ➤ The implementation of wireless enhanced 9-1-1 should not significantly delay the implementation of PCS.
- Ensure that, over time, mobile radio service users on the public switched telephone network have the same level of access to 9-1-1 emergency services as wireline callers.
- ★ ➤ Concern for the social, economic and other costs of including or excluding various categories of mobile radio services from any 9-1-1 compatibility requirements that might be developed.
- ★ ➤ Determine a time frame for the implementation of enhanced 9-1-1 feature requirements.
- ★ ➤ Concern on whether and how the proposed performance requirements, particularly phase-in periods, should be applied to existing systems.
- ★ ➤ Concern on whether or not to limit the enhanced 9-1-1 capability to real-time voice services only.
- Define the essential capabilities of wireless enhanced 9-1-1.
- ★ ➤ Location information should include X-Y and Z information.
- ★ ➤ Concern over the specific technical and cost considerations affecting the implementation of ALI in wireless telephone services.

- ★ ➤ Impact, in terms of size, of imbedded elements in future telephone devices.
- ★ ➤ Impact of the ALI/ANI technology on the cellular, PCS, mobile satellite and other CMRS applications. (cost and difficulty)
- ★ ➤ Capable of delivering:
  - 1) Call back number
  - 2) Instrument subscriber's name
  - 3) ALI in X-Y-Z
  - 4) Service provider's name and telephone number
  - 5) Class of the service, e.g. residence, business, etc.
  - 6) Priority of the caller, e.g. hospital, school, etc.
  - 7) Routing information for Selective Routing
- ★ ➤ Impact on the interface of the proposed technology with the existing 9-1-1 infrastructure.
- ★ ➤ Impact on the survivability of 9-1-1 SS7 based calls during a common channel signaling outage utilizing the proposed technology.
- ★ ➤ Impact of the proposed technology and the use of telecommunications devices for the deaf (TDD's).
- ★ ➤ Should have little impact on small entities.

While the list above does not cover every issue established in the NPRM it covers the items of most significance where our technology applies. The next two sections of this paper summarize our technology and how it impacts each element. As above, every element of the NPRM is not addressed and little attention is focused on the elements for which our technology will have little or no impact.

## **Description of Technology**

### **Opening Statement**

The lack of ALI (automatic location identification) and ANI (automatic number identification) from Cellular calls in the Enhanced 9-1-1 telephone service is well known. This issue has been addressed by NENA, PCIA, TIA, APCO, CTIA and TISI with technology, time frame for short term and long term solutions, signaling standards and data format being addressed. The various issues associated with wireless technology were identified and prioritized in Nashville, Tennessee at the 1994, NENA Telco/Vendor Conference. These items were again addressed at the Telecommunications Industry Association's Joint Expert's meeting in Chicago in August 1994, and again at the Personal Communications Industry Association's Joint Expert's meeting in Reston, VA in October 1994. It is our belief that the technology discussed in this paper addresses these issues in a way that will satisfy the short and long term issues associated with wireless operation in an Enhanced 9-1-1 environment.

9-1-1 system loading statistics show that the average wireline 9-1-1 call lasts for approximately 36 seconds where the average cellular 9-1-1 call lasts for from 5 to 10 minutes. This increased time is primarily due to the lack of ALI and the lengthy time necessary to interrogate the caller for location. Most 9-1-1 networks were engineered prior to the explosion of cellular traffic and the burdens associated with dealing with the network loading created by these cellular 9-1-1 calls. This increased time per call and the increased call loading volume translates into greater network needs, public safety personnel requirements and equipment.

### **Roving Automatic Location Identification (RALI)**

RALI (U.S. Patent Pending) is an adaptation of existing technology and new technology developed by Smith Advanced Technology, Inc. (SAT). RALI provides both ALI and ANI from the

wireless telephone caller as well as allowing voice conversation between the caller and the 9-1-1 PSAP (Public Safety Answering Point). RALI takes advantage of the GPS (Global Positioning System) to determine the position of the mobile telephone. The more than 13 billion dollar publicly funded system, which is also maintained by public funds, is available free of charge for individual use.

RALI equips the mobile telephone with a GPS engine, a micro controller, software logic and appropriate telephone interface electronics such that when the emergency number, 9-1-1 is dialed, an order from the PSAP will be honored to transmit to the PSAP current position, direction of travel, speed and call-back telephone number and allow voice communication, all over the single voice path. Positioning information is transmitted in IEEE-754 format and consists of latitude and longitude in hexadecimal radians, altitude in hexadecimal meters and speed and direction as velocity vectors in hexadecimal meters-per-second. This transmission protocol, which also requires order-for-response and a specific sequence of subsequent events, provides privacy protection for the caller. This transaction is performed using the audio capability of the mobile telephone and is, therefore, transparent to the mobile service provider and the Public Switched Telephone Network (PSTN).

In order to accommodate the current installed base of mobile telephones, RALI provides a retrofit kit. This compact kit is electrically installed between the telephone handset and transceiver and does not affect the normal operation of the mobile telephone. With a simple electrical and packaging redesign of the mobile telephone, RALI can be fully incorporated within the mobile telephone, even hand held models.

The PSAP portion of RALI is implemented in a nominal personal computer with a 486DX or equivalent processor and can interface to most current PSAP telephone equipment. Integration with existing computer aided dispatch (CAD) systems is also possible with RALI.

RALI is automatically activated when a call of wireless origin is received. RALI automatically determines if the wireless telephone is RALI equipped and then orders the wireless telephone to transmit its positioning information and call-back telephone number, then enables voice

communications. This transaction takes place in less than 500 milliseconds. RALI will compute the real time location of the caller from the transmitted data and will place a marker on a street level map which will visually locate the caller for the PSAP call-taker, in proper relationship to the map. Since this information is in latitude/longitude coordinates, it may be directly transferred to emergency response units, such as medical helicopters, for immediate use in routing to the emergency location. RALI will also compute and display in text, altitude, speed, direction of travel and the call-back number. The PSAP portion of RALI may be fully integrated into an existing or new PSAP or provided as a stand-alone device by way of a suitable interconnect with the PSAP.

## **9-1-1 Issues Addressed by RALI**

### **▣ Automatic Location Identification (ALI)**

ALI is addressed through the GPS data as transmitted to the PSAP and displayed in text and visually on a computerized street level map display, as described above. Included in the displayed information is the house number and street name address, if such address exists as well as the latitude, longitude, altitude, direction of travel. While the RALI mobile does not provide the house number and street name, the latitude and longitude provided by the RALI mobile can be used by most mapping systems, including the RALI PSAP system, to find the house number and street name closest to the coordinates given.

### **▣ Automatic Number Identification (ANI)**

ANI is addressed through the transmission of the telephone number as programmed into the RALI interface or as stored in the wireless telephone memory. As this information is not readily altered, it is considered to be reliable.

### **▣ Selective Routing (SR)**

Selective Routing is address by RALI via the boundary capabilities of most GIS (Geographical Information System) mapping programs. A call is routed based

at the Cellular switch or at the PSAP level by way of either automatic routing or operator selected routing. The usual means of achieving selective routing with RALI is to locate the RALI Router at the Public Switched Telephone (PSTN) tandem switch or ALI data base/wireline selective router location, as in the Rockwell/Smith implementation which was demonstrated in New Jersey in October 1994 and is referenced in a latter section of this response.

At the Cellular switch level, a data structure is stored at the switch, which recognizes the incoming cellular 9-1-1 call and routes it to the appropriate PSAP, based on the X-Y (latitude-longitude) location data.

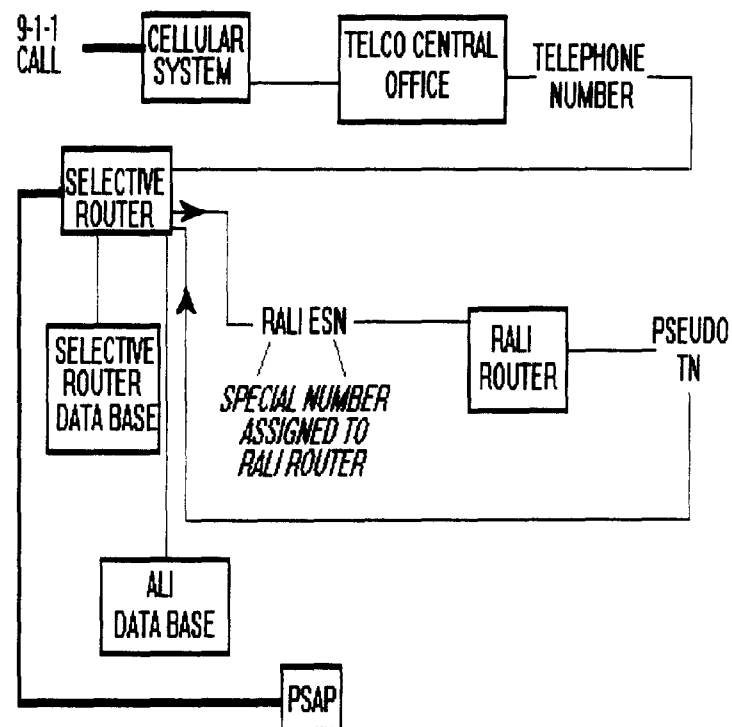
When installed at the central office location in conjunction with the PSTN wireline selective router and ALI data base, the routing is conducted based on the following arrangement.

Based on the diagram on page 9, the following sequences comprise the entire selective routing process for a RALI equipped cellular telephone.

1. A 9-1-1 call is placed.
2. The telephone company central office determines the trunk ID number.
3. The central office routes the call to the ANI data base where the selective router routes the call to the RALI Router. (Only for those calls associated with cellular system ID's as set up in the routing table)
4. The RALI Router interrogates the cellular telephone and determines if it is RALI equipped or not. If it is RALI equipped, the location information is used to assign a pseudo telephone number to the call, which is derived from the X - Y coordinates. In many 9-1-1 systems, a pre-route can be done on trunks pre-identified as those coming from cellular or wireless systems. This greatly enhances the wireless routing process.



5. The pseudo telephone number is sent back to the selective router via an RS-232 port.
6. Once in the selective router, the ANI data base recognizes the pseudo telephone number as belonging to a particular ESN/ESZ and routes the call to the appropriate PSAP (Public Safety Answering Point)



## **Items of Specificity**

- **Type of ALI Format**

As the information supplied by RALI does not impact the Cellular equipment or the PSTN, there is little concern over the ALI data format. By way of software manipulation, the ALI format of the received data from the GPS engine can be read into local databases for call event recording. Since most PSAP equipment is either computer driven or interfaced with a computer aided dispatch (CAD) system, ALI format can be tailored at the PSAP level in many cases. The ALI format from the RALI interface can also conform to existing formats, which would cause no change to occur, however, the X, Y, Z and some other information may not be displayable on the existing PSAP equipment if this is the method chosen. Separate display of wireless calls is always an option.

- **ALI Accuracy Needs**

The current level of accuracy is controlled primarily by the Department of Defense through the GPS system Selective Availability (SA) function but is no less than 100 meters. Most transactions are within 30 meters. Accuracy can be improved and the dependability of this accuracy using the Differential GPS process which uses a fixed reference receiver to correct the SA induced error.

In those situations where cross country travel is required by the wireless user, acquisition can be very long. To remedy this situation, individual cell sites can be programmed through extended protocol messaging to update the current almanac, thus reducing the time required to refresh the user's device when it comes alive at that location.

One of the issues in accuracy is the "In-Building" situation. RALI does not have to depend on the GPS for in-building situations in the Personal Communications

System network. RALI will transmit the location of the building's base station or the base station on the individual floor of the building, provided the location information is loaded into the transmitting equipment. The existing cellular systems are not as limited in building penetration, as is the existing GPS. By the combination of RALI and TrackMobile technology, building penetration problems are virtually eliminated.

- Responsibility for Enhanced 9-1-1 Data

The responsibility for 9-1-1 data is a very significant issue if the wireless environment is treated the same as the wireline environment. As the on-board data base is resident with the individual wireless device using the RALI approach, there is no great concern for storage, access and updating of Enhanced 9-1-1 data. The GPS/RALI approach eliminates the need for large data bases and database maintenance. Since the telephone number is essential for billing, the encoding of the telephone number by the wireless provider essentially supplies the data requirement.

- Customer Awareness and Education

Customer awareness and education for the retrofitting and use of this new technology becomes the responsibility of the local public safety agencies and possibly the wireless provider. Additional services utilizing the RALI technology may entice users to retrofit. Cooperation by the wireless device manufacturers to incorporate the technology into new devices will cause the application to be widely spread in a relatively short period of time.

- PSAP Equipment

Since RALI interfaces with existing PSAP equipment there is no need to cause a change in the current wireline Enhanced 9-1-1 equipment, including CAD (Computer Aided Dispatch) systems.

- TDD(Telecommunications Device for the Deaf) Compatibility

Compatibility with TDDs is not a problem for this device. Since TDDs are already manufactured which function with wireless technology and RALI interfaces with this technology, there is no problem with the dual interface. RALI is transparent to the TDD, just as it is transparent to the wireless device. RALI can be equipped with an RJ-11 port for wireline device interface, which makes it plug compatible with any wireline telephone device. Further, RALI eliminates the need for the caller to describe their location. The caller would only have to verify their location when asked to do so by the PSAP telecommunicator.

- ALI Privacy of Information

The protocol used in the software logic provides for privacy protection of the wireless user so that the wireless device identification and location is only provided as authorized. Use of the RALI unit requires the wireless user to initiate a 9-1-1 call, then RALI validates an order from the PSAP unit before location information will be transmitted. The user knows when information is requested by way of an audible signal.

- Other Wireless Devices

RALI technology readily lends itself to adaptation in other wireless or wireline devices such as cordless telephones and handsets, radio beacons or alarm systems. Because the RALI approach is transparent to the wireless carrier no problems interfacing with Satellite services and PCS providers are expected.

- Selective Availability

Selective Availability is the intentional introduction of error into the GPS by the U.S. Government. This error introduction does affect accuracy. DGPS, as mentioned earlier, does overcome some of this. The more ideal situation would be the elimination of Selective Availability. An effort by those interested in the

utilization of the GPS in the private and State/Local Government arenas would at least inform the U.S. Government authorities of the need for consistent accuracy.

- Reference Receivers

The use of reference receivers improves GPS accuracy to under 30 meters under most circumstances, even when atmospheric interference or satellite problems occur. These receiver/transmitters, located in the more populated areas of the country, would improve the GPS to a very accurate level. As the range of the broadcast DGPS is usually very good, it is not unreasonable to anticipate coverage capability for 90% or more of the population of the U.S. RALI does not utilize this capability, and tests conducted without the use of DGPS have provided quite satisfactory results.

There are several means of accomplishing DGPS coverage for the remainder of the country. One would be a cooperative effort on the part of the wireless community, the local government and the federal government. Other approaches could include efforts to achieve federal funding for the entire effort, such as the Federal Aviation Administration's current activity to provide wide area DGPS coverage for aircraft. Research into grants programs may yield some opportunities for funding.

- Implementation Costs

The cost to implement any new technology is always a consideration for those involved or required to implement said technology. The approach presented here offers a solution that distributes the implementation costs to all concerned. No one entity or operation is adversely affected by high costs to implement. The cost to the PSTN is minimal; the cost to the cellular consumer is expected to be less than \$50.00 additional cost per telephone when manufactured into the telephone; the cost to retrofit existing cellular phones is expected to be around \$200.00 per phone by the

industry is nominal; the cost to the PSAP is generally less than \$40,000.00 (depending on the scale of integration and the level of service desired) with basic offerings as low as \$5,000.00. Economies are achieved by integration with existing equipment and software products.

Based on the traffic loading figures mentioned earlier, it is not inconceivable that cost savings could be obtained that would greatly offset the implementation costs of location and identification technologies. By reducing the call time of the average wireless 9-1-1 call from 5 to 10 minutes to 1 or 2 minutes, the network overhead can be reduced, or at the very least, network growth would be halted for a time. This reduction of load is also realized at the PSAP since call time is reduced, more calls can be handled with fewer personnel. With the cellular 9-1-1 call growth running at about 68% since 1987, continued growth is a very real consideration. Increased calls and call times translate into increased costs to every part of the 9-1-1 infrastructure, therefore, less call time should result in decreased cost.

- Implementations/Trials

The products and methods mentioned in this paper are not merely ideas. RALI devices have been fully functional and installed since March, 1994. The RALI Router has been successfully interfaced with a Rockwell SCX 9-1-1 switch and fully tested with the State of New Jersey. This test involved real-time location determination, routing and PSAP telecommunicator interrogation.

## Specific Comments by Issue

### ➤ Availability of 9-1-1 to wireless telephone users.

Availability of 9-1-1 to all wireless telephone users is an issue that does not directly impact the technology of SAT. We do believe, however, that 9-1-1 [send] should be standard across the country and that any location technology should not have a negative impact on this effort.

### ➤ Ensure that 9-1-1 services are not compromised by new developments in technology.

As above, we believe that no new technology should adversely effect the availability of 9-1-1 [send]. We also believe that the offering of new technologies should not adversely effect the 9-1-1 infrastructure. SAT products and methods work within the existing 9-1-1 base and have a minimal impact on the PSAP. The impact on new handsets for use in PCS is also minimal. The marriage of SAT technology with that of TrackMobile, Inc., will provide full coverage for all PCS communications devices, existing and future, without inhibiting technology.

### ➤ Require commercial mobile radio services (CMRS) to provide real time voice service to include Enhanced 9-1-1 features available to wireless users. Those features shall include, but not be limited to:

- 1) Automatic Number Identification
- 2) Automatic Location Identification
- 3) Selective Routing

RALI works with virtually all types of wireless devices. Radios in the Specialized Mobile Radio Service (SMRS) and other types of CMRS equipment will interface with RALI. This applies to both digital and analog equipment. In so doing, RALI can provide ANI, ALI and selective routing in almost any communications environment, even in mixed modes.

- A single three-digit number, 9-1-1, for nationwide access to emergency services.

RALI has no negative impact on the policies which prescribe a single nationwide standard for 9-1-1 access. It actually has a positive impact in that the technology used in RALI in no way precludes changes in policy regarding the dialing of 9-1-1.

- Personal Communications Services to provide accurate location information for 9-1-1 callers from the outset.

RALI is ready for imbedded implementation into newly manufactured PCS equipment. As before, RALI coupled with a technology such as that of TrackMobile, will provide accurate, dependable location information in virtually any environment or location.

- Mandate a single 9-1-1 standard for all wireless technologies.

While opinions do vary as to the necessity for a single 9-1-1 standard for wireless technologies, we feel that the only way to achieve the goal of universal access to fully enhanced 9-1-1 services is to prescribe a single standard. To apply Time Difference of Arrival (TDOA) in one system and GPS in another would create a situation where persons traveling from area to area would be left without access to location capability. The best way to achieve economy in terms of applying location technologies is in scale. If a single standard is chosen, the cost for that technology will decrease rapidly as the application numbers increase.



- The implementation of wireless enhanced 9-1-1 should not significantly delay the implementation of PCS.

As before, there appears to be no reason why the implementation of the RALI approach would delay the implementation of PCS.

- Ensure that, over time, mobile radio service users on the public switched telephone network have the same level of access to 9-1-1 emergency services as wireline callers.

Since RALI has no impact on the PSTN, it will not impede the development of access standards for queues or priorities.

- Concern for the social, economic and other costs of including or excluding various categories of mobile radio services from any 9-1-1 compatibility requirements that might be developed.

The application of some location technologies require the implementation of elaborate equipment at the wireless transmitter sites and a data network that connects all sites. In order to apply these technologies, a grid of coverage would have to be developed for each and every CMRS system. At the current cost estimates for such a system there would be a significant impact, economically, on the cellular, PCS, SMRS and ESMRS providers, as well as the PSTN which would have to establish an alternate data delivery system for the information obtained by the location system. Since RALI does not effect the wireless network in any way there is no impact there. The impact on the PSTN is only the cost of the selective routing capability for each existing selective router.

- Determine a time frame for the implementation of enhanced 9-1-1 feature requirements.

Retrofitting and new manufacture of RALI is possible immediately. There would be a twelve week delay for retrofit distribution to begin and some design work will be required by the handset manufacturers to embed the chipset, but it is not expected to take a significant time for this to occur. Selective routing can begin within three to six months, depending on the exact method chosen by the various PSTN providers. PSAP implementation could begin immediately for most PSAPs and within a few weeks for others.

- Concern on whether and how the proposed performance requirements, particularly phase-in periods, should be applied to existing systems.

We feel that phase in periods should exist, regardless of which technology or technologies are chosen. A reasonable time period would be two to three years. This will allow time for manufacturing and installation.

- Concern on whether or not to limit the enhanced 9-1-1 capability to real-time voice services only.

9-1-1 capability should be limited to only those services capable of contacting emergency service providers. If the possibility does not exist that satellite data services will be used for contacting emergency services then enhanced 9-1-1 capability is not necessary.

- Define the essential capabilities of wireless enhanced 9-1-1.

As a minimum, wireless enhanced 9-1-1 should provide the items identified in the PCIA, APCO, NENA and NASNA Emergency Access Position Paper. There is no reason that the requests made in this paper can't be addressed with existing technologies in both a reasonable time frame and an economically reasonable cost.

- Location information should include X-Y and Z information.

We agree that the raw X, Y and Z information should be presented to the PSAP. With this information provided in a standardized data format, the PSAP can use the information to cause any number of functions to occur.

- Concern over the specific technical and cost considerations affecting the implementation of ALI in wireless telephone services.

As mentioned above, the implementation cost of RALI is distributed over the wireless community. The user, the PSAP and the PSTN share in the cost of full implementation creating no great financial burden on any one area as opposed to some of the other technologies which will greatly effect the PSTN and wireless network.

- Impact, in terms of size, of imbedded elements in future telephone devices.

The RALI chip-set is small enough to embed in most devices and still maintain small size. The dimensional requirements would cause an increase in size of approximately 1.25 cubic inches. As advancements in technology and miniaturization continue, it is not unreasonable to believe that this chip-set will be further reduced in size in the very near future.

- Impact of the ALI/ANI technology on cellular, PCS, mobile satellite and other CMRS applications. (cost and difficulty)

As has already been stated, the cost to implement GPS technology appears to be the most equitably distributed of the ALI/ANI technologies. Since the cost is primarily borne by the user, no one entity has to absorb a large share of the expense. The technology is already proven and is known not to be difficult to implement, either at the handset level, selective routing or at the PSAP.

- Capable of delivering:

- 1) Call back number
- 2) Instrument subscriber's name
- 3) ALI in X-Y-Z
- 4) Service provider's name and telephone number
- 5) Class of the service, e.g. residence, business, etc.
- 6) Priority of the caller, e.g. hospital, school, etc.
- 7) Routing information for Selective Routing

RALI can provide all of the information listed above. All of the items except "7" are encoded into the device and unchangeable. Item "7" is derived from the location information obtained in "3".

- Impact on the interface of the proposed technology with the existing 9-1-1 infrastructure.

The impact of RALI on the existing 9-1-1 infrastructure is very small. The RALI base interface operates on a number of computer platforms. It will also interface with most computerized mapping systems and intelligent PSAP equipment. The cost per PSAP is generally between \$5,000.00 and \$40,000.00, depending on complexity and features desired.

Due to the fact that RALI transmits ALI and ANI “in-band” on the voice channel with the call, no separate point of entry into the existing 9-1-1 wireline infrastructure is required. RALI also does not require any special infrastructure in order to locate the caller, since it utilizes the existing GPS system and can take advantage of the technology developed by TrackMobile. This translates into a very economical interface for the 9-1-1 PSAP community.

➤ Impact on the survivability of 9-1-1 SS7 based calls during a common channel signaling outage utilizing the proposed technology.

The impact of RALI technology on the SS7 is the same as any wireline application. Since RALI takes advantage of the wireline interface to the wireless carriers and does not require any special data paths. RALI does offer the advantage of being fully functional even if the wireline 9-1-1 data link is lost. With common channel, in-band signaling RALI does not require anything but a voice setup to be fully operational.

➤ Impact of the proposed technology and the use of telecommunications devices for the deaf (TDD's).

The only impact that RALI has on the use of TDD's is that during location transmissions or during location updates there is a 500 millisecond interruption of the audio portion of a call. Other than these interruptions there is no impact on the use of TDD's. It should be noted that the initial location of a call is accomplished before the TDD conversation is started.

➤ Should have little impact on small entities.

By the very nature of RALI there would be very little impact on small entities since the entry into RALI is determined by the entity itself. The entity determines the level of complexity it desires. Since RALI accomplishes data transfer on the voice channel, the local entities would not be responsible for the installation of and monthly cost of separate data lines.

### **Closing Statement**

In overall review of the Commission's NPRM and the filings made by APCO, NENA, NASNA and PCIA we concur with the desired elements completely. We also agree with the findings by the various "Joint Experts Meetings" that no single technology exists which can satisfy, completely, the elements set forth in the NPRM in an economically and technologically feasible manner. We do feel that the marriage of Smith Advanced Technology's RALI and TrackMobile's technology does adequately satisfy every applicable element of the NPRM. We also feel that the distribution of expense associated with the implementation of these technologies is the most equitable and reasonable to all concerned. We invite the Commission or any other entity to examine the work that we have done and look forward to our field trials with TrackMobile in the next few weeks. We also stand ready to assist the Commission or any other entity in the evaluation and testing of our technologies.

Respectfully Submitted

A handwritten signature in cursive script, appearing to read "Bill Smith", is written over a horizontal line.

Smith Advanced Technology

Bill Smith, President